INTERNATIONAL CELLULAR MOBILE TELEPHONE INSTALLATION

INSTALLATION GUIDE

TABLE OF CONTENTS

1. **INSTALLATION PLANNING** 1
   - 1.1 Radio unit location 1
   - 1.2 Handset Location 1
   - 1.3 Speaker Location 1
   - 1.4 *V.S.P.* Hands-Free Microphone Location 1
   - 1.5 Power/Control Cable Routing 2
   - 1.6 Aerial Location 2
   - 1.7 Electrical Power Connections 3
   - 1.8 Convenience On/Off Feature 4
   - 1.9 Auxiliary Alert Feature 5
2. **INSTALLATION** 5
   - 2.1 Radio Installation 6
   - 2.2 Handset Mounting 11
   - 2.3 Speaker Installation 13
   - 2.4 *V.S.P.* Hands-Free Microphone 14
   - 2.5 Power/Control Cable and Aerial Cable Installation 17
   - 2.6 Connecting The Cables 18
3. **PERFORMANCE CHECKS** 20
   - 3.1 Checking Radio Performance 20
   - 3.2 Checking Anti-Skid Braking Systems 20
   - 3.3 Auxiliary Alert 22
   - 3.4 *V.S.P.* Hands-Free Operation 22
4. **NAM PROGRAMMING** 23
   - 4.1 Introduction 23
   - 4.2 Programming The NAM Using R1801A Programmer 23
   - 4.3 Programming The NAM Using The Control Unit (For Single System Operation) 23
   - 4.4 Programming The NAM Using The control Unit (For Dual System Operation) 24

1. INSTALLATION PLANNING

1.1 RADIO UNIT LOCATION

In most vehicles, the best location for the radio unit is the floor of the boot compartment. Regardless of the location choice, be sure the radio unit is protected from dirt and moisture. For optimum cooling, the radio should be mounted with the side closest to the aerial connector away from the mounting surface. Allow adequate clearances for the control/power cable connector, aerial coaxial cable, and radio unit removal.

1.2 HANDSET LOCATION

Consider the following factors when deciding the handset mounting location:

- The mounting surface must have sufficient strength to support the handset.
- The handset must be within easy reach of the driver during normal operation of the vehicle and should not interfere with the driver's or passengers' seating or leg space.
- The handset must also be within reach of the handset end of the radio control/power cable.

1.3 SPEAKER LOCATION

Some models are equipped with an external speaker. This speaker should be mounted in a location that will not interfere with vehicle operation and should be within reach of the speaker connector end of the radio control/power cable. The speaker should be mounted, using the supplied mounting bracket.

IMPORTANT NOTE

The speaker should never be installed behind a sound-absorbing barrier. Also, it should never be mounted without a support, to prevent it from shifting while the vehicle is in motion.

1.4 *V.S.P.* HANDS-FREE MICROPHONE LOCATION

If the radio unit is equipped with the *V.S.P.* Hands-Free option, special consideration should be given to the *V.S.P.* microphone mounting position, since its location affects the performance of the *V.S.P.* Hands-Free operation. This microphone should be mounted directly

above the driver – either on the sun visor or on the headliner but within reach of the microphone connector end of the radio control/power cable.

IMPORTANT NOTE

The *V.S.P.* microphone SHOULD NEVER BE INSTALLED near the side window or in a location where the road or background noise will be substantially high (higher than 85 dB SPL).

1.5 POWER/CONTROL CABLE ROUTING

If the vehicle is provided with wire troughs in the door sills, use them to provide maximum protection for the cable and to simplify cable installation routing. For vehicles without the wire troughs, route the cable in such manner as would protect them from pinching, sharp edges, and crushing. As an alternative, route the cable along one side of the drive shaft hump under the carpet. Use the grommets whenever a cable must pass through a metal panel hole. Regardless of the routing method used, make sure that all in-line connectors are accessible.

IMPORTANT NOTE

In vehicles equipped with electronically-controlled anti-skid brakes, ROUTE ALL CABLES ON THE OPPOSITE SIDE OF THE VEHICLE FROM THE BRAKING MODULATOR BOX IN ORDER TO SUBSTANTIALLY REDUCE INTERFERENCE FROM THE RADIO.

1.6 AERIAL LOCATION

The centre of the vehicle roof is considered the best location for mounting the aerial. Before drilling any holes, (1) make sure that the aerial cable can be routed to the radio with ease, and (2) check the aerial location for any electrical interference (using a temporary magnet mount). Please note that any two metal pieces rubbing against each other (such as seat springs, shift levers, boot and bonnet lids, exhaust pipes, and others) close to the aerial can cause severe radio interference.

IMPORTANT NOTE

The aerial should be mounted in such a position so that no part of the human body will normally rest within 20 cm of any part of the aerial for more than a few minutes while the radio equipment is being operated—unless the vehicle is equipped with an intervening metallic screen having an area not less than 0.3 cm squared. Also, make sure that the radio is connected to the aerial via a non-radiating coaxial cable.

NOTE

An optional "through-the-glass" type aerial can be mounted on the rear window of the vehicle. This type of aerial (if used) should be positioned as high as possible on the window. Also make sure that the "inductive" button on the mounting foot is not crossed by a rear window defogger element. Refer to the manufacturer's specific installation instructions.

1.7 ELECTRICAL POWER CONNECTIONS

The radio is designed to operate in a negative-ground, 12-volt electrical system only. The best power connection point for the positive power leads (red wires) is the positive terminal of the vehicle battery. If a direct connection to the battery terminal is not possible, connect the positive power leads to the starter solenoid. The negative power leads (black wires) must be connected to a good vehicle chassis ground.

IMPORTANT NOTE

The negative power leads MUST BE FUSED, if they are to be connected directly to the negative terminal of the vehicle battery.

NOTE

Many parts of the vehicle can produce noise that interferes with radio operation. The ignition system is the most common source of electrical noise. Consequently, during installation planning, be sure to check the condition of the ignition wiring and the connections to the vehicle battery. Verify that the connections between the battery negative terminal, vehicle chassis, and engine block have low resistance. All wire connections should be clean and tight.

1.8 CONVENIENCE ON/OFF FEATURE

The convenience On/Off feature allows the user to turn the radio on and off with the vehicle ignition key switch. For proper operation of the equipment, the power/control cable ignition sense lead (green/black wire) must be connected to an accessory A + terminal on the vehicle fuse block that is controlled by the vehicle ignition key switch. Refer to Table 1 which provides detailed operational description of this feature.

Table 1. Ignition Sense Lead Connections

Sense Lead Connections	Initial Conditions	Action	Result
Ignition	Mobile Off, Ignition Off	Depress Power	Mobile on and locked.
	Mobile Off, Ignition On	Depress Power	Mobile on, lock state from memory. When auto-lock feature (applicable models only) is enabled, the memory lock status is overridden and the mobile will always power up in the locked mode.
	Mobile On, Ignition Off	Depress Power	Mobile off; During intervals of operation with the ignition off, the lock status in memory can be changed from unlocked to locked (but not from locked to unlocked). This lock status memory is used when the ignition is turned on with the mobile off. The mobile on/off status in memory will remain unchanged.
	Mobile On, Ignition On	Depress Power	Mobile off.
	Mobile Off, Ignition Off	Ignition On	Mobile on/off and lock states from memory; When auto-lock feature (applicable models only) is enabled, the memory lock status is overridden and the mobile will always power up in the locked mode; the lock status will be that which is in memory and the mobile condition (on or off) will be the same as it was the last time the ignition was turned off.
	Mobile Off, Ignition On	Ignition Off	Mobile off.
	Mobile On, Ignition Off	Ignition On	Mobile on with existing lock state.

Table 1. Ignition Sense Lead Connections (Cont'd.)

Sense Lead Connections	Initial Conditions	Action	Result
	Mobile On, Ignition On	Ignition Off	Mobile off; While a call is in progress, mobile power down (or going to standby mode) is delayed after turning the ignition off until the call is terminated; When the auxiliary alert feature is provided and enabled, the mobile will go to standby mode (applicable models only) or will remain on (all other models) when the ignition is turned off.
Not Connected	Mobile Off	Depress Power	Mobile on and locked.
	Mobile On	Depress Power	Mobile off.

1.9 AUXILIARY ALERT FEATURE

1.9.1 The auxiliary alert feature allows the user to be notified of incoming calls via repetitive operation of the vehicle headlights, horn, etc. For proper operation of this feature, it is recommended that the power/control cable auxiliary alert lead (yellow/black wire) be connected to the auxiliary alert device (headlights, horn, etc.) through a suitable relay (Part No. 59K813674) using a 2-ampere slow-blow fuse for circuit protection.

1.9.2 The auxiliary alert lead provides a ground for the first five rings generated by the radio, with each ring having a duration of 1 second. The auxiliary alert lead has a rated maximum capacity of 500 milliamperes.

2. INSTALLATION

The radio equipment components should be installed in the following sequence:

- radio
- handset
- speaker (if equipped)
- *V.S.P.* Hands-Free microphone (if equipped)
- control/power and aerial cables

2.1 RADIO INSTALLATION

2.1.1 Horizontal Mounting Using Standard Bracket (SLN4523A)

Refer to Figure 1. Be sure that the selected mounting location allows for adequate cooling for the radio, with the side closest to the aerial connector facing away from the mounting surface.

Step 1. Place the mounting bracket on the selected mounting surface and mark the locations for three (3) mounting screws.

Step 2. Center punch the screw locations and drill 1/8" holes for the mounting screws.

WARNING

Exercise extreme care in order to avoid drilling into the petrol tank or some other vital part of the vehicle.

Step 3. Apply two rubber pads on mounting bracket and two rubber pads on the bottom of the radio, as shown in Figure 1.

Step 4. With the radio in place under the mounting bracket, secure the bracket to the mounting surface, using the self- tapping screws and lockwashers provided.

2.1.2 Vertical Mounting Using Standard Bracket

Follow the same procedures for horizontal mounting (Figure 1) except for the three mounting screws. Instead of the mounting screws, use three suitably-sized bolts, nuts, and washers (these items are supplied by installer). Place a lockwasher between each bolt and the mounting bracket, insert the bolts through the bracket and holes drilled in mounting surface, and secure with flat washers and nuts.

2.1.3 Mounting Using Wing-Nut Bracket

Refer to Figure 2. Be sure that the selected mounting location allows for adequate cooling for the radio, with the side closest to the aerial connector facing away from the mounting surface. Be sure that the selected location provides easy access to the wing-nut to release the bracket.

Step 1. Place the bottom plate and the top bracket on the selected mounting surface and mark the locations for the four (4) mounting screws.

Step 2. Center punch the screw locations and drill 1/8" holes for the mounting screws.

Step 3. Apply two rubber pads on the top bracket and one on the bottom plate as shown in Figure 2.

Step 4. Secure the bottom plate to the mounting surface using the two (2) self-tapping mounting screws adjacent to the stud for the wing nut.

Step 5. Slip the top bracket over the stud for the wing nut and align the two mounting holes with similar holes in the bottom plate. Secure using the remaining two mounting screws passing through both the top bracket and the bottom plate as shown in Figure 2.

Step 6. Slip the radio into the space between the loose top bracket

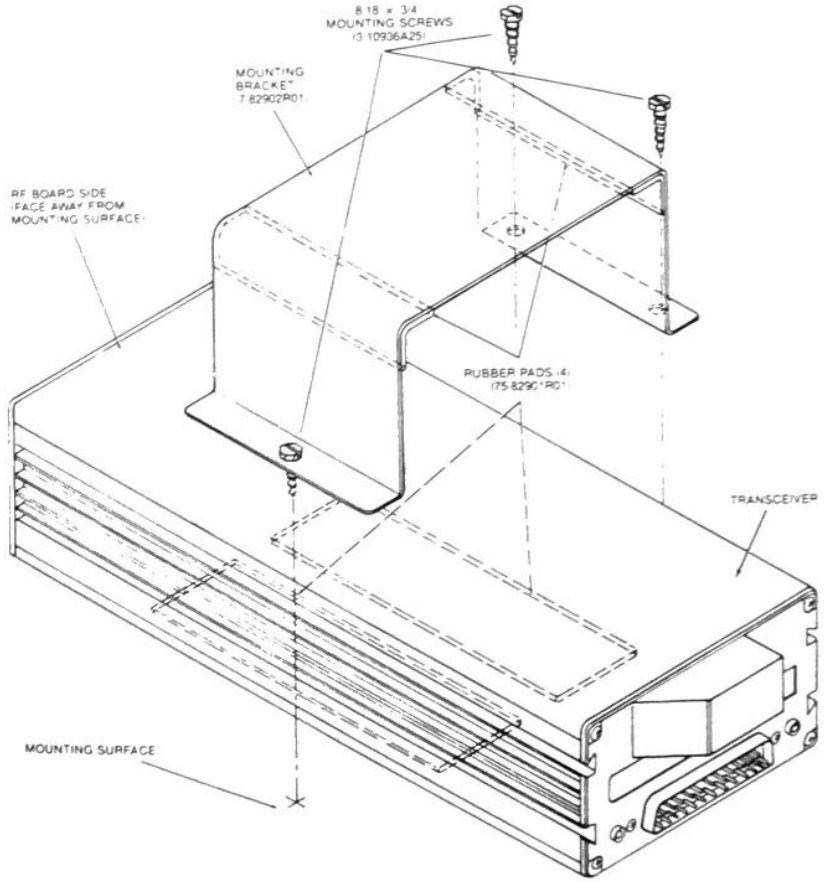

Figure 1. Horizontal Mounting of Radio

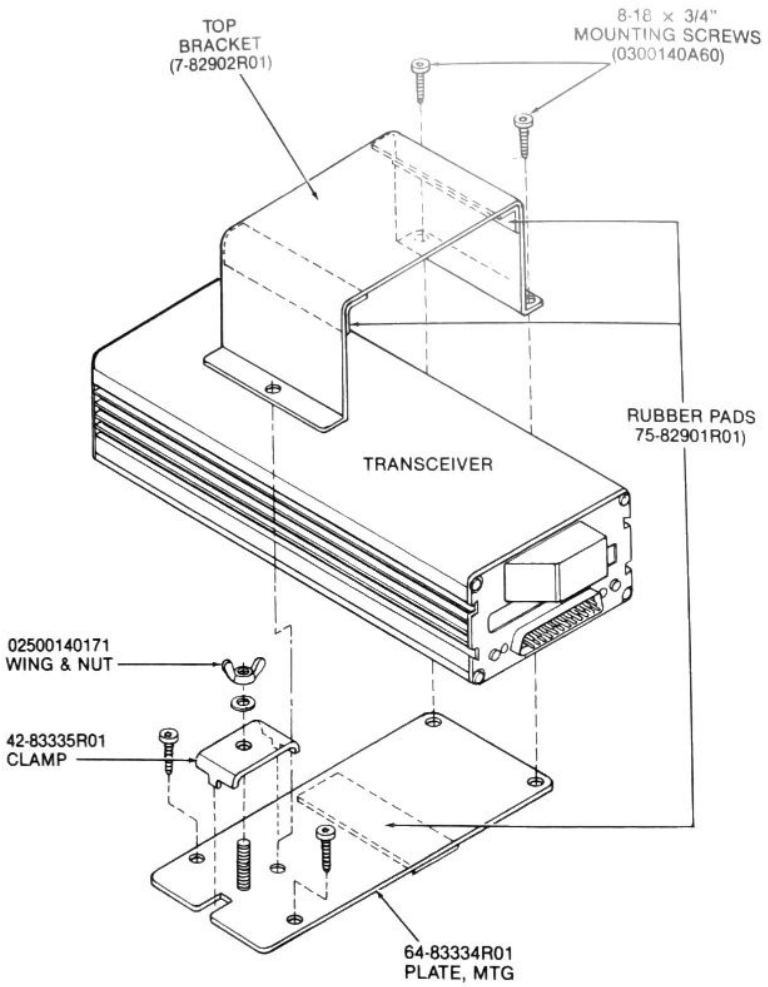

Figure 2. Mounting of Radio Using Locking-Style Bracket

and bottom plate as shown in Figure 2. Secure using the wing nut and locking clamp provided.

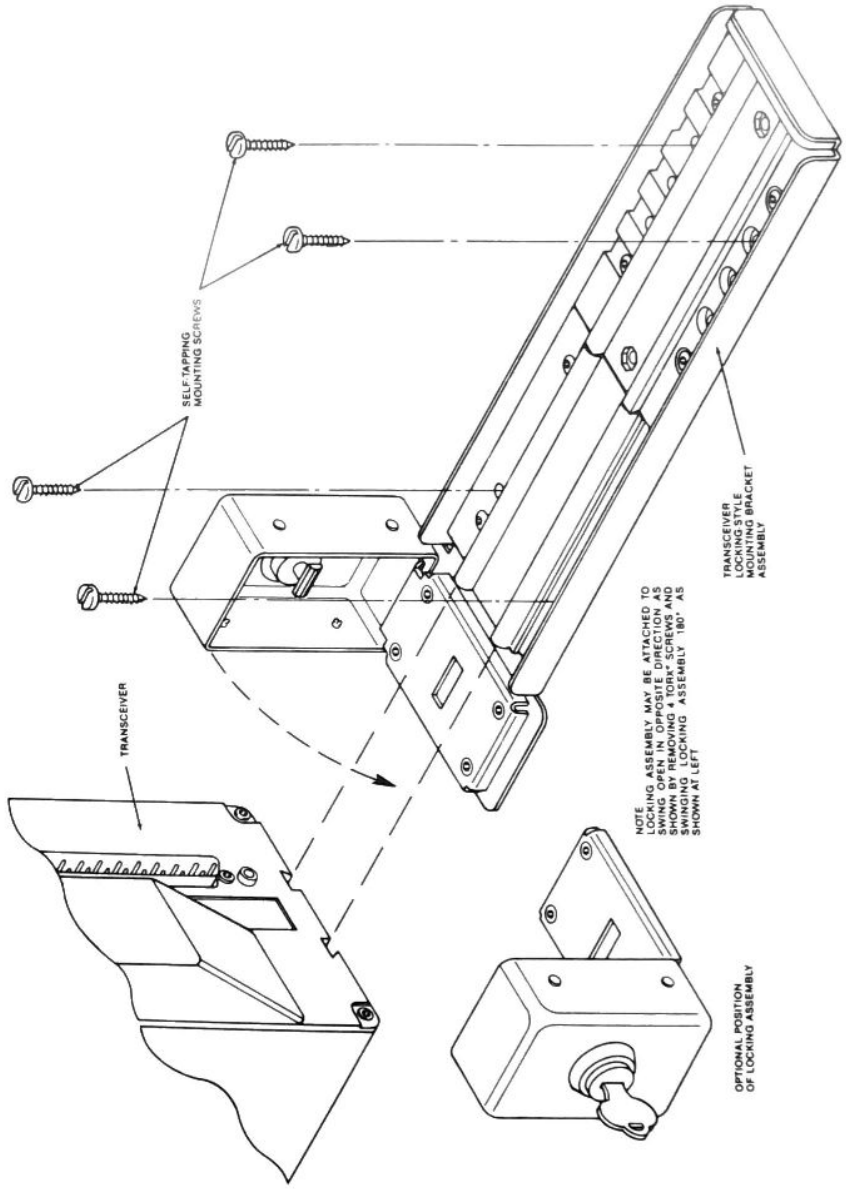

Figure 3. Mounting of Radio Using Locking-Style Bracket

Step 7. If desired, cover the projecting mounting stud with the protection tip provided.

2.1.4 Mounting Using Locking-Type Bracket

Refer to Figure 3. The locking-type mounting bracket can be attached to the mounting surface (horizontal or vertical), using bolts or self-tapping screws. Be sure to allow for clearance of the control/power cable connector and aerial coaxial cable.

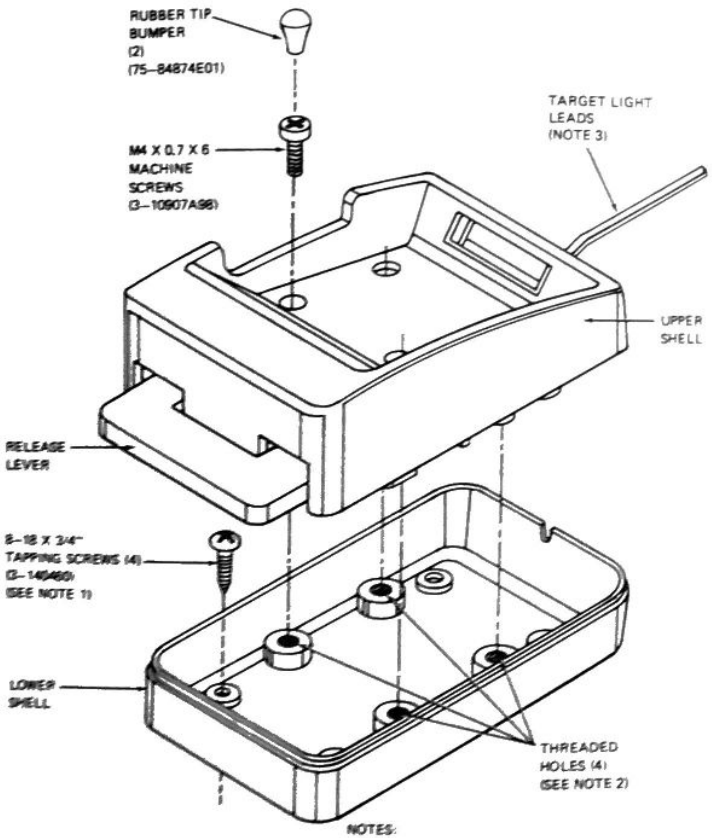
RUBBER TIP BUMPER (2) (75–84874E01)
TARGET LIGHT LEADS (NOTE 3)
M4 X 0.7 X 6 MACHINE SCREWS (3–10907A98)
UPPER SHELL
RELEASE LEVER
8–18 X 3/4" TAPPING SCREWS (4) (3–140460) (SEE NOTE 1)
LOWER SHELL
THREADED HOLES (4) (SEE NOTE 2)
NOTES:
1. THE FOUR 8–18 TAPPING SCREWS ARE USED ONLY WHEN LOWER SHELL IS MOUNTED DIRECTLY ON A FLAT SURFACE.
2. THE SECOND SET OF FOUR THREADED HOLES IS USED WHEN LOWER SHELL IS MOUNTED ON THE ADJUSTABLE ANGLE BRACKET.
3. THE TRACER LEAD OF THE TARGET LIGHT LEADS SHOULD BE CONNECTED TO A+ (IF THE TARGET LIGHT IS TO BE USED).

Figure 4. Standard Mounting Cup Installation

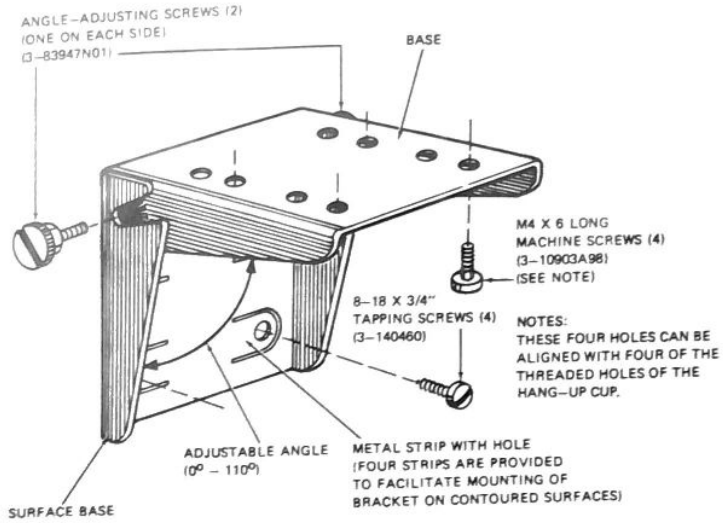
ANGLE–ADJUSTING SCREWS (2) (ONE ON EACH SIDE) (3–83947N01)
BASE
M4 X 6 LONG MACHINE SCREWS (4) (3–109003A98) (SEE NOTE)
8–18 X 3/4" TAPPING SCREWS (4) (3–140460)
NOTES:
THESE FOUR HOLES CAN BE ALIGNED WITH FOUR OF THE THREADED HOLES OF THE HANG–UP CUP.
ADJUSTABLE ANGLE (0° – 110°)
METAL STRIP WITH HOLE (FOUR STRIPS ARE PROVIDED TO FACILITATE MOUNTING OF BRACKET ON CONTOURED SURFACES)
SURFACE BASE

Figure 5. Adjustable Angle Bracket Installation

2.2 HANDSET MOUNTING

The handset hangs in a standard mounting cup (Figure 4) which can be mounted by itself or by using the adjustable angle bracket (Figure 5).

2.2.1 Standard Mounting Cup by Itself

Step 1. Refer to Figure 4. Ensure that the selected mounting surface is sufficiently strong to support the mounting hardware.

Step 2. Using the lower shell as stencil, mark the location of the four outer holes then drill four 4.1 mm (5/32") holes.

Step 3. Using the M5 tapping screws, mount the lower shell.

Step 4. Place the upper shell on top of the lower shell, making sure that the target light leads are properly routed to the outside, via the small apertures provided in the lower shell or between the two shells on the mounting cup. This should be the case only if the target light will be used; otherwise, the leads should be cut and left inside the mounting cup shells.

Step 5. Using the M4 machine screws, secure the upper shell to the lower shell.

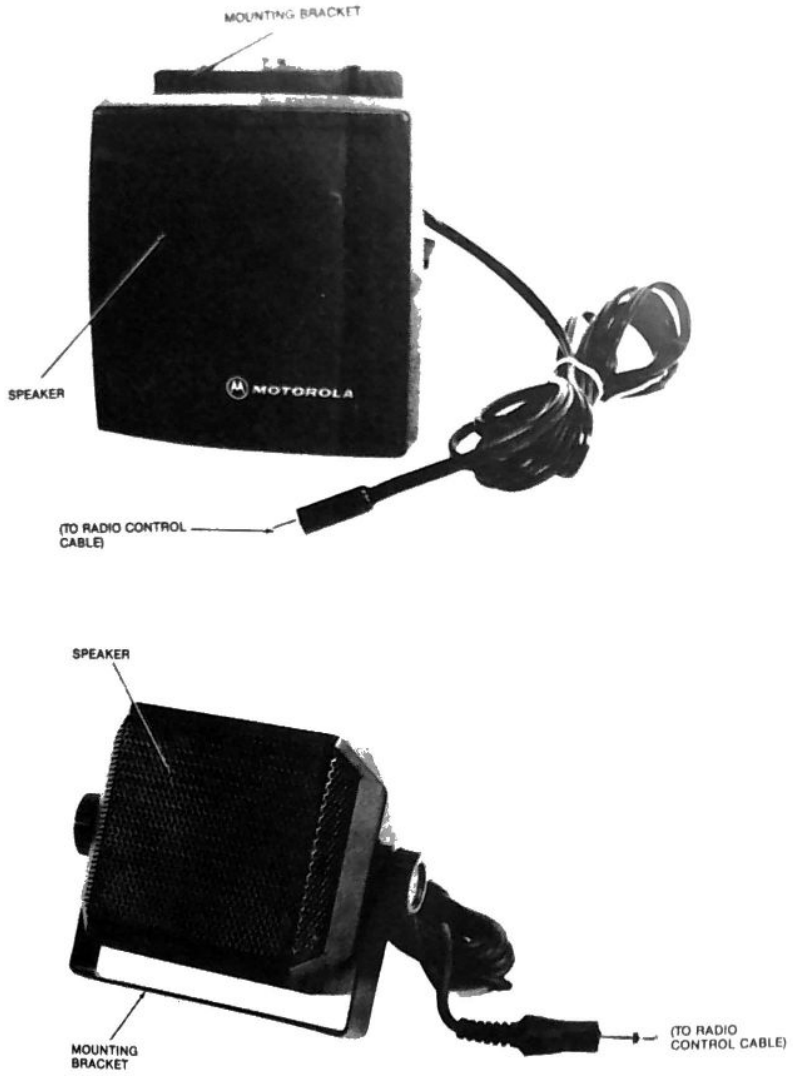

Figure 6. External Speakers

Step 6. If the target light is used, connect the leads to the appropriate voltage source in the vehicle (e.g., the accessory fuse in the fuse block).

2.2.2 Mounting with Adjustable-Angle Bracket

Refer to Figures 4 and 5. Verify that the selected mounting surface is sufficiently strong to support the mounting hardware. The mounting surface does not have to be completely flat since the metal strips on the bracket can accommodate mounting surfaces that are slightly curved.

2.3 SPEAKER INSTALLATION

Some models are equipped with an external speaker (Figure 6). This speaker should be mounted under the dash, on the transmission hump, or in some other suitable location.

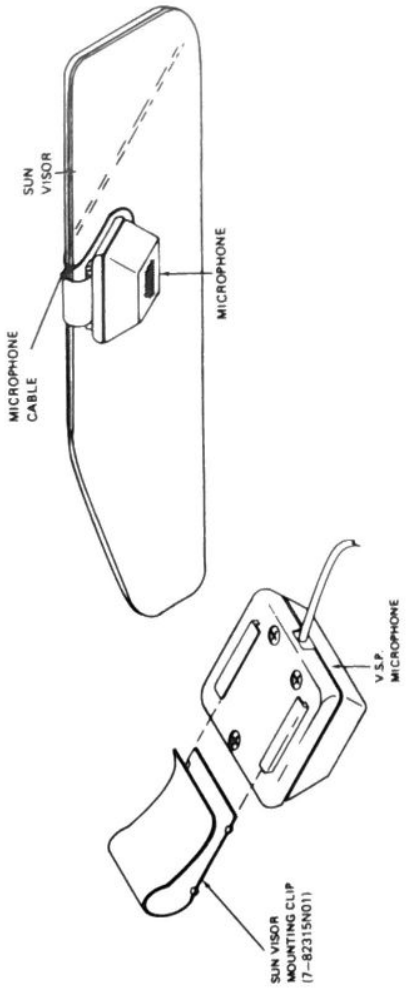

Figure 7. Sun Visor Clip Installation

2.4 *V.S.P.* HANDS-FREE MICROPHONE

Three different types of *V.S.P.* microphone mounting brackets are available for the hands-free operation. This permits mounting of the hands-free microphone in a variety of ways to meet various mounting considerations that may change from one vehicle to another. In all installations, the microphone cable should be routed in the most inconspicuous manner to the power/control cable connector (e.g., behind the windscreen pillar trim, behind the kick panels, or some other arrangement).

2.4.1 Visor Clip Mounting Bracket (Provided)
(Refer to Figure 7)

The visor clip mounting bracket provides the simplest and most effective mounting of the hands-free microphone. The clip slides into channels on the microphone housing and then clips onto the sun visor.

2.4.2 Screw-Mounted Bracket (Optional)
(Refer to Figure 8)

The screw-mounted bracket (Part No. 7-82316N01) may be used if the preferred mounting position (previously explained) is not possible. The bracket is supplied with two (2) mounting screws which secure the bracket to the desired mounting surface, such as the windscreen pillar, dashboard, and some other suitable surface.

Step 1. Select an alternate microphone mounting location. Consideration should be given to the microphone mounting criteria relating to winds and road noise to ensure proper *V.S.P.* operation.

Step 2. Hold the bracket in the desired location and make sure that there is enough clearance to permit sliding of the microphone.

Step 3. Using the mounting bracket as a template, drill two 2.4 mm (3/32") holes.

Step 4. Using the two #4-24 x 1/4" screws, secure the bracket to the mounting location. Make sure that the mounting clip rails (extending outward) are away from the mounting surface.

NOTE

Before attaching the bracket to the mounting surface, a felt pad or similar item should be placed between the bracket and mounting surface to reduce noise feedback from the surface to the microphone.

Step 5. Slide the microphone onto the clip rails and route the cable.

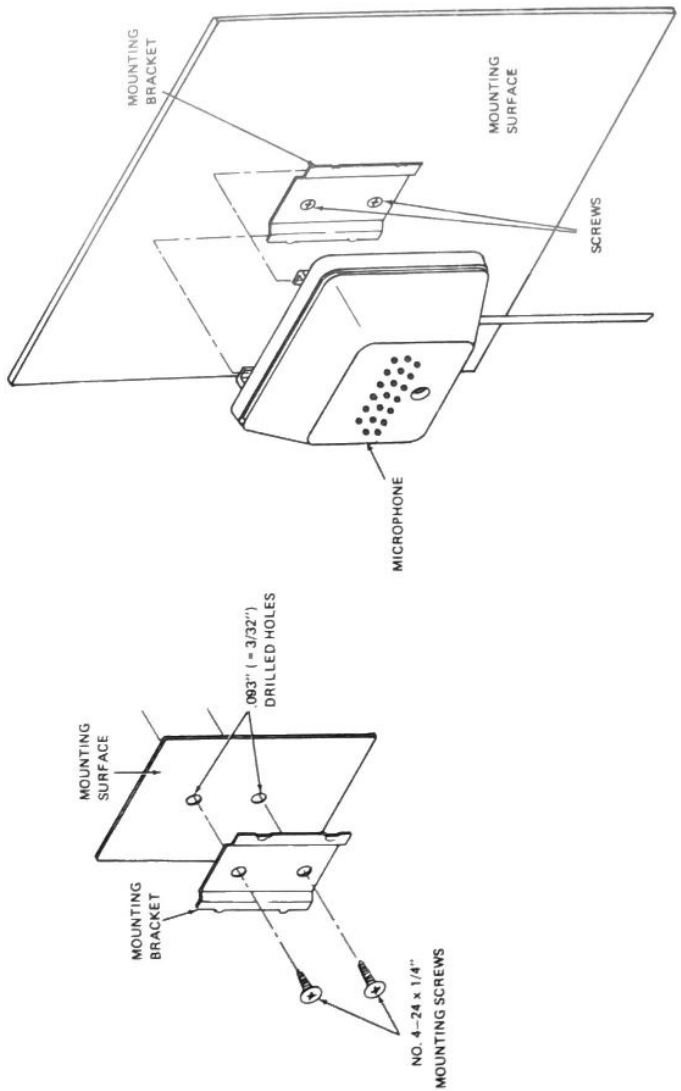

Figure 8. Screw-Mounting Bracket Installation

2.4.3 Trim Mounting Bar (Optional)
(Refer to Figure 9)

The trim mounting bar (Part No. 7-82314N01) may be used with installations that do not accommodate either the sun visor or the screw-mounted bracket mounting methods.

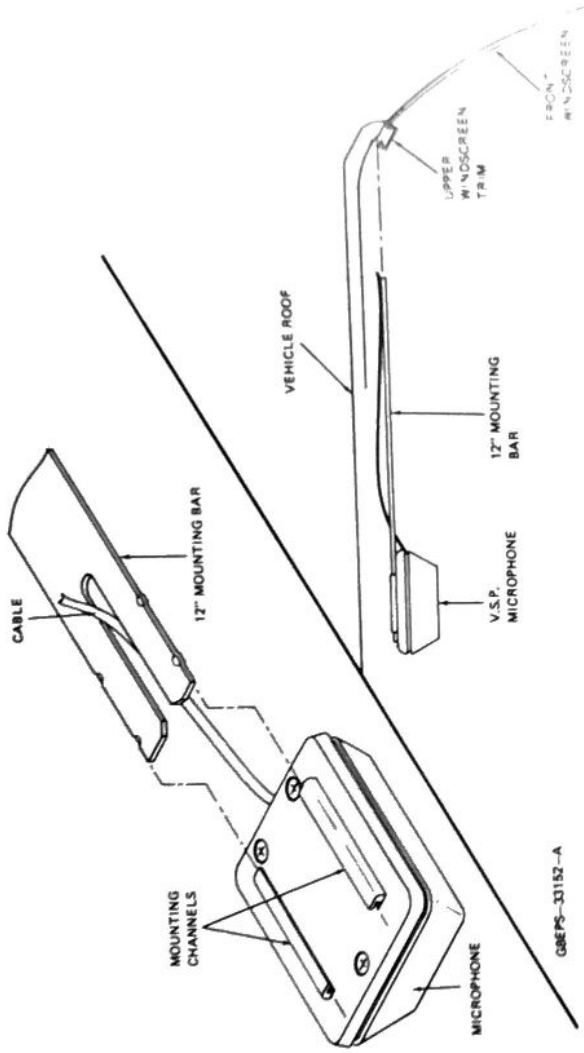

Figure 9. Trim Mounting Bar Installation

Step 1. Loosen the windscreen trim, if necessary, and slide the end of the 12-inch bar opposite the slot between the headliner and the windscreen trim; the four small bumps along the slot should face downwards. It may be necessary to bend the end of the bar to allow it to slide between the trim and the headliner. This should position the microphone approximately in the same area in which the

sun visor would normally be mounted. If this is not the case, the bar may be shortened accordingly.

Step 2. Tighten the windscreen trim, if necessary, to secure the bar against the headliner.

Step 3. Route the microphone cable through the slot and slide the microphone onto the bar rails until it locks against the small bumps.

Step 4. Route the cable to the speaker box.

NOTE

A felt pad or similar item should be placed between the trim bar (at the microphone) and the vehicle headliner to reduce noise feedback from the vehicle roof.

2.5 POWER/CONTROL CABLE AND AERIAL CABLE INSTALLATION

(Refer to Figure 10)

Step 1. Route the power/control cable through the boot partition into the passengers' compartment. Run the handset connector to the approximate location of the handset. Run the external speaker connector to the approximate location of the external speaker (if equipped).

IMPORTANT NOTE

DO NOT PULL on the connector housings while routing the cable.

Step 2. Route the power cable (2 red #19 SWG) A + supply into the engine compartment.

NOTE

If the fuse block is located in the passengers' compartment, do not pull the ignition sense line (green/black) through.

NOTE

If the auxiliary alert device is to be used in the passengers' compartment, do not pull the auxiliary alert line (yellow/black) through.

Step 3. Install and route the aerial coaxial cable. Refer to the instruction section included with the aerial for details on how to prepare, route, and install the aerial coaxial cable.

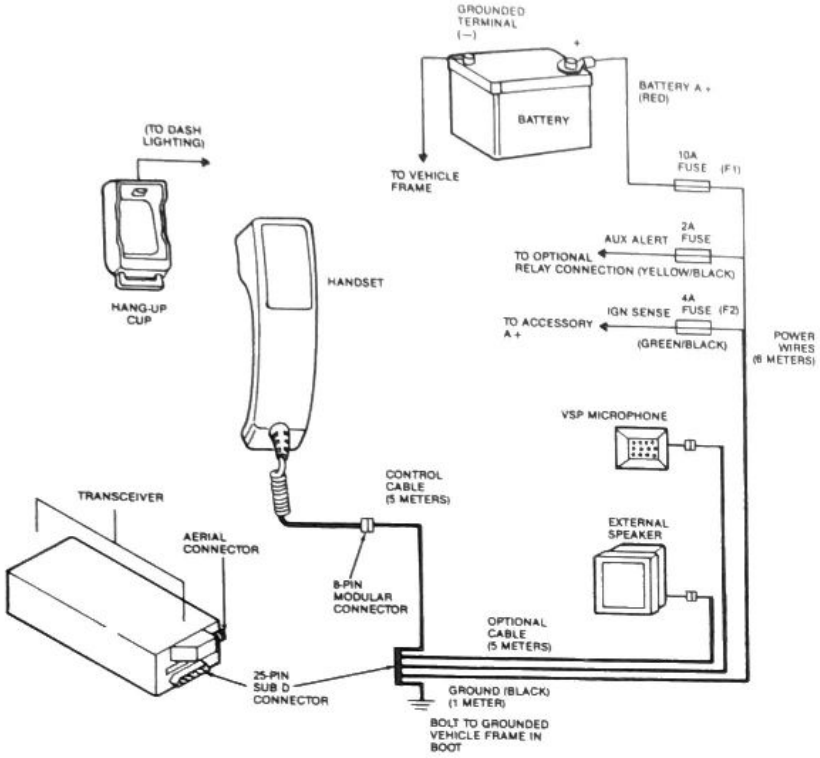

Figure 10. Installation Wiring Details

2.6 CONNECTING THE CABLES

Step 1. Connect the coaxial cable to the radio and to the aerial.

NOTE

Remove all fuses and tape them to their respective holders before making any connection. DO NOT INSERT the fuses until all connections have been made and carefully inspected.

Step 2. Bolt the black leads of the power/control cable to the vehicle frame in the boot compartment.

IMPORTANT NOTE

Special attention should be given to locating a good vehicle ground. Optimum radio performance can only be achieved with a ground connection having a very low resistance. The vehicle frame makes the best ground, but body structural reinforcement members are also suitable for grounding purposes. One of the bolts under the mat on the boot floor may also be used. Thoroughly clean the bolt and the boot floor if the black lead lug is to be bolted to the floor.

Step 3. Connect the D-type connector on the power/control cable to the radio set.

Step 4. Check the power cable fuses (F1 and F2) and make sure that the correct sizes and types are supplied.

Step 5. The fused green/black ignition sense lead (F2, 4A) of the power cable should normally be connected to an accessory A + terminal at the vehicle fuse block. The lead may optionally be left unterminated. Refer to Table 1.

Step 6. Cut the red wire connected to the supplied F1, 10A fuse holder (to position the fuse in the desired location) and connect one end of the fused red lead to the positive (ungrounded) battery terminal, using the lug supplied with the cable kit. Strip the other end of the fused red lead approximately 1/2" (12.7 mm) and insert into one end of the supplied blue crimp-style, in-line connector. Crimp the connector down on the red wire.

Step 7. Insert the two red #18 AWG (#19 SWG) A + supply wires from the cable kit into the other end of the blue connector. Crimp the connector down on these two wires.

Step 8. Connect the external speaker connector from the cable kit into the connector from the external speaker.

Step 9. Check the power cable A + connection and verify that the lead is connected to the correct polarity.

Step 10. Pull all excess cabling into the boot. Using the supplied cable clamps, clamp the cables to the vehicle body or chassis.

Step 11. Carefully inspect all cables and connections; then insert the 10A fuse F1 into the fuseholder on the red lead and the 4A fuse F2 in the fuseholder on the green/black lead (if connected in Step 5).

3. PERFORMANCE CHECKS

3.1 CHECKING RADIO PERFORMANCE

Once the radio has been installed, its performance should be checked, using the following procedure. Refer to the User's Manual for instructions on how to turn on, unlock, and key the radio.

Step 1. Connect the radio to the vehicle aerial through a directional wattmeter and measure its power output. The voltage standing wave ratio (VSWR) should be less then 2:1. Measure the forward power (Pf) and the reflected power (Pr) with the wattmeter and then compute the VSWR by means of the following equation:

$$VSWR = \frac{1+R}{1-R}$$

where: $R = \sqrt{Pr/Pf}$

If the VSWR is greater than 2, check the aerial and its cable and connector.

Step 2. Place a call from the mobile unit and confirm that it is operating properly.

Step 3. Have an assistant place a call to the mobile unit and verify proper operation of the unit.

3.2 CHECKING ANTI-SKID BRAKING SYSTEMS

3.2.1 General

Electronically-controlled brakes and/or guidance systems **should be checked very carefully** and at different speeds for any sign of abnormal operation.

Although the radio meets or exceeds all rf emissions requirements, the rf power emitted from the aerial cannot be eliminated without adversely affecting operation of the radio. All electronic automotive control systems **should meet stringent** EMI specifications; but a defective control system may have gone undetected until it is required to operate it in the vicinity of a transmitting aerial.

3.2.2 Test Procedure

This test is divided into eight different checks in order to cover several types of interference. Disturbance of an electronic anti-skid braking system can usually be detected in several different ways: e.g., the lights, irregular audible sounds, noticeable change in the braking system performance, etc.

While performing checks 1 through 8, however, none of the above-cited conditions should occur if the radio set has been properly installed.

CHECK 1. With the car stationary (gear selector in **PARK**), the engine running at a fast idle, and your foot off the brake pedal, make a phone call.

CHECK 2. Repeat the previous check, except that this time you should step on the brake pedal.

CHECK 3. With the car stationary (and leaving at least 2 car lengths of clear area in front of the vehicle), step softly on the brake pedal and exert just enough pressure with your foot to prevent the vehicle from moving. Place the car in a forward gear with the engine running at a fast idle, then make a phone call.

WARNING

Disruption of the anti-skid braking system may cause the vehicle to move forward; it may also cause flashing of the lights and/or generation of irregular audible sounds.

CHECK 4. With your foot off the brake pedal and driving at a moderate speed of 15 to 25 miles/hour (24 to 40 km/hour), have an assistant make a phone call.

CHECK 5. With your foot exerting slight pressure on the brake pedal to turn on the brake lights, repeat Check 4.

CHECK 6. While making moderate deceleration stops from 25 to 30 miles/hour (40 to 48 km/hour), have an assistant make a phone call.

WARNING

SEVERE DISRUPTION of the electronic anti-skid braking system **MAY CAUSE LOSS OF VEHICLE CONTROL** while performing the following test.

CHECK 7. While making "panic" stop from 20 mph (32 kmph), have an assistant make a phone call.

CHECK 8. If no interference or disruption occurs, repeat Check 7 by making "panic" stops from 30 mph (48 kmph).

IMPORTANT NOTE

If no malfunctions are observed while performing any of the above tests, it can be assumed that no apparent problems exist and that the car can be released to the customer. **HOWEVER**, if any of the above-cited tests causes a brake malfunction, the installation procedure should be **STOPPED** and the radio **REMOVED** from the car **IMMEDIATELY**. Also contact the car manufacturer's Service Department as soon as possible.

3.3 AUXILIARY ALERT

The Auxilary Alert feature allows an additional alerting device to be activated for the first 5 rings of an incoming call (15 seconds). This is useful if you will be outside of the vehicle and expect a call. Cellular telephones are allowed to ring up to 21 times (1 minute) before the call attempt is automatically cancelled. The normal alert ringer is operable for all 21 rings.

Step 1. Prepare the unit to receive test calls by enabling the auxiliary alert feature, in accordance with the procedures provided in the User's Manual.

Step 2. Verify that the alert device has been activated by the incoming call and then answer the call.

Step 3. With the auxiliary alert feature enabled, have a second call placed. **DO NOT** answer the call. Verify that after approximately 20 seconds, the alert device has been deactivated and that the display is indicating **CALL** after being enabled in the manner described in the User's Manual.

3.4 *V.S.P.* HANDS-FREE OPERATION

After verifying that all handset and radio cable connectors are properly seated in their appropriate receptacles, apply power to the radio and place a test call, using the *V.S.P.* operating procedures outlined in the User's Manual. This should be followed by other test calls to verify proper operation of the radio under various conditions.

4. NAM PROGRAMMING

4.1 INTRODUCTION

The number assignment module (NAM) is a memory block contained in an integrated circuit located on the transceiver audio/logic board which stores system control and option information. Prior to operating the mobile telephone, the NAM must be programmed by the installer, technician, or user with the proper data for operation in the particular cellular system.

4.2 PROGRAMMING THE NAM USING R1801A PROGRAMMER

The NAM may be programmed using the Motorola R1801A (equipped with UKXL3 RTL4844A-D or later version software). Refer to the instructions provided with the R1801A and software package for details.

4.3 PROGRAMMING THE NAM USING THE CONTROL UNIT (FOR SINGLE SYSTEM OPERATION)

NOTE

Programming the NAM via the control unit may not be available with some models of transceiver.

The following instructions describe NAM programming using the control unit for radiotelephones equipped to operate only in a single system.

NOTE

When using any of the control units for NAM programming, the mobile telephone may either be installed in the vehicle, or assembled at a test bench.

Step 1. Install the mobile telephone into the vehicle (or alternatively assemble the mobile telephone on a test bench). Attach the connector extender to the transceiver front D-type connector; then connect the control/power cable to the extender. Note that this D-type connector extender is available through the local sales representative under Amphenol part number C155425-02.

Step 2. **For bench programming only —** Connect the positive lead of a + 12 V bench supply to the GRN-WHT wire and to either of the RED wires of the control/power cable; connect the bench supply negative (Gnd) lead to either of the black wires at the radio connector end of the control/power cable.

Step 3. Power up the unit by depressing the on/off key, with the ignition on or the bench supply turned on. This places the unit in test mode operation. Press the # key to activate the test mode. (Only

the far right-hand segment on the bottom row of digits will be illuminated, indicating you are in test mode).

Step 4. To initialize NAM programming from the control unit, enter **55#**. (This step places the unit in the programming mode starting with programming step one. The two digits on the left side of the top row of the display indicate the programming step number. The remainder of the display shows the current NAM contents or new data as it is entered.)

Step 5. Sequentially step through the programming steps using the asterisk (*) key and enter the desired programming data. Refer to Table 3 for descriptions of programming steps and data. Depress the asterisk (*) key to skip any step where the default is acceptable.

IMPORTANT NOTE

Note that the steps indicated by an X located in Table 2 must be programmed for basic operation.

Step 6. Once Step 18 of the programming sequence has been completed, press the asterisk (*) key for the data to be programmed into the NAM.

NOTE

Remember to remove the connector extender from the transceiver front D-type connector following NAM programming.

4.4 PROGRAMMING THE NAM USING THE CONTROL UNIT (FOR DUAL SYSTEM OPERATION)

The following instructions describe NAM programming using the control unit for radiotelephones equipped to operate in two separate service systems. This requires the NAM to be programmed for each system, designated here as parts A and B. Part A is comprised of steps 01 through 18. After programming part A, a depression of

Table 2.
Minimum Required NAM Programming for Basic Operation

		Step						
Cellular System Service Type		**1**	**3**	**4**	**6**	**8**	**9**	**12 (Bit C6)**
Single Service System		X	X	X	X	X	X	
Dual Service System	NAM part A	X	X	X	X	X	X	X
	NAM part B	X	X	X	X			

the asterisk (*) key accesses step 01 of part B (which contains only steps 1, 2, 3, 4, 5, 6, and 14) for the second system.

NOTE

The assignment of system programming information to parts A and B is arbitrary. For example, in the case where a mobile telephone is being programmed to operate in both System A and System B, the System A information may be programmed into part A and the System B information into part B. [Note that in order to program part B of the NAM, bit C6 in step 12 of part A must be set to 1. If second system operation is not desired, bit C6 in Step 12 of part A should remain a 0 (default)].

Step 1. Repeat Steps 1-4 in paragraph 4.3.

Step 2. Sequentially step through the programming steps using the asterisk (*) key and enter the desired programming data for parts A and (if desired) B. Note that for part B only the programmable steps are accessible (i.e., Steps 1-6 and 14). Depress the asterisk (*) to skip any steps where the default is acceptable. Refer to Table 3 for descriptions of programming steps and data.

IMPORTANT NOTE

Note that the steps indicated by an X located in Table 2 must be programmed for basic operation.

Step 3. Once the programming sequence has been completed for parts A and (if desired) B, press the asterisk (*) key for the data to be programmed into the NAM.

NOTE

Remember to remove the connector extender from the transceiver front D-type connector following NAM programming.

Table 3. NAM Programming Sequence

Definition of Programming Commands

*	**Advances to the next programming step; also loads the NAM after the last programming step is entered.**
Clr	**Clears the entered information and displays previously entered data for the current programming step.**
#	**Exits the programming mode without programming the NAM.**

Step	Standard Default	Description
01	00000	**System ID Number.** Number assigned by system operator for system identification.
02		**A OPTION BYTES** The option code displayed for address 02 represents the status of eight options [bits A7 (msb) through A0]; A7 is programmed first followed by A6-A0. Bits enter display and scroll to left; Final display shows bit A7 in upper right and bits A6-A0 on lower line of display.
	0	**Local Use (Bit A7).** If set to 1 mobile will respond to local control orders in the home area. Assigned by system operator.
	0	**Preferred System (Bit A6).** [Applies to units capable of operating on two service systems (A or B).] 0 indicates system B; 1 indicates system A.
	1	**End-to-End Signaling (Bit A5).** When enabled indicates mobile is equipped for DTMF signaling via the keys after the landline connection is made. 1 = enabled, 0 = disabled.
	0	**Bit not used (Bit A4).** Enter 0.
	1	**Repertory (Bit A3).** Indicates mobile is equipped with speed-dialing storage. 1 = enabled, 0 = disabled.
	1	**Auxiliary Alert (Bit A2).** When enabled, user can place the mobile in auxiliary alert mode and be notified of incoming calls via an auxiliary device. 1 = enabled, 0 = disabled.
	0	**H/F Auto Mute (Bit A1).** When enabled, mobile will automatically be in the mute mode when a call is placed with V.S.P.™ hands-free mode. 1 = enabled, 0 = disabled.

Table 3. NAM Programming Sequence (Cont'd.)

Step	Standard Default	Description
	0	**MIN MARK (Bit A0).** Supplied by system operator. When enabled the user's MIN 2 will be sent with each call initiated or answered. 1 = enabled, 0 = disabled.
03	1110111111	**User 10 digit mobile phone number.** Number is assigned by system operator.
04	1110111111	**User 10 digit MIN.** Number is assigned by system operator.
05	17	**Systems station class mark.** The service system is assigned a 2 digit station class number by the system operator.
06	00	**Access overload class.** This 2 digit number specifies the level of priority assigned to the mobile for accessing the system. These numbers are assigned by the system operator.
07	—	**Not Used.** (Step number not displayed).
08	000000	**Security code.** This 6 digit number supplied by the user stores the code used by the user to check and change the 3-digit lock code and service levels.
09	123	**Unlock code.** This 3 digit number is supplied by the user for the purpose of allowing only user-approved individuals access.
10	—	**Not Used.** (Step number not displayed).
11		**B OPTION BYTES** The option code displayed for address 11 represents the status of eight options [bits B7 (msb) through B0]; B7 programmed first followed by B6-B0. Bits enter display at lower right and scroll to left; final display shows B7 in upper right and B6-B0 on lower line of display.
	0	**Bit not used (Bit B7).** Enter 0.
	0	**Bit not used (Bit B6).** Enter 0.
	0	**Bit not used (Bit B5).** Enter 0.
	0	**Extended Field (Bit B4).** When enabled mobile would scan more than 32 paging channels. Currently not used in United Kingdom.
	1	**Single System Scan (Bit B3).** If set to 1, the mobile will scan only one system based on the setting of the preferred system bit (part of A OPTION BYTES). 1 = enabled, 0 = disabled.
	1	**Auto Recall (Bit B2).** This option allows the user to access repertory by a one or two digit send sequence. 1 = enabled, 0 = disabled. Normally enabled.
	0	**Disable Service Levels (Bit B1).** If set to 1, service levels could not be changed from the control unit. 1 = disabled, 0 = enabled. This bit should be enabled.

Table 3. NAM Programming Sequence (Cont'd.)

Step	Standard Default	Description
	0	**Lock Code (Bit B0).** When enabled the user is allowed to lock and unlock the mobile unit via his 3 digit lock code. 1 = disable, 0 = enabled. This bit should be enabled.
12		**C OPTION BYTES** The option code displayed for address 12 represents the status of eight options [bits C7 (msb) through C0]; C7 programmed first followed by C6-C0. Bits enter display at lower right and scroll to left; final display shows C7 in upper right and C6-C0 on lower line of display.
	0	**User NAM Programming (Bit C7).** When enabled, allows user to program the NAM from control unit. 1 = disabled, 0 = enabled.
	0	**Single/Dual System (Bit C6).** Enter 0 for radiotelephones equipped for single system operation; Enter 1 for radiotelephones equipped for dual system operation (and dual system operation is desired).
	0	**Call Timer (Bit C5).** When enabled the user can access the call timer. 1 = disabled, 0 = enabled. Normally enabled.
	1	**Auto Redial (Bit C4).** Provides redialing of the last number entered into the control unit. 0 = enabled, 1 = disabled. Normally disabled.
	1	**Speaker Disable (Bit C3).** This bit is used to disable handset call processing speaker (some models) when adding *V.S.P.* option. 1 = handset speaker disabled, 0 = handset speaker enabled.
	0	**Not Used (Bit C2).**
	1	**Selectable System (Bit C1).** When enabled user is allowed to select the primary system. 0 = enabled, 1 = disabled. Normally enabled.
	0	**Not Used (Bit C0).** Enter 0.
13		**D OPTIONS BYTES**
	0	**Max Volume (Bit D7).** Sets max volume to Step 4.
	0	**Theft Disable (Bit D6).** When set to 1, theft alarm feature is not accessible.
	0	**Beeper Disable (Bit D5).** Disables call beepers. (1 = disabled)
	1	**EXT DTMF (Bit D4).** When clear, DTMF is routed directly thru APC. Enter 1.
	0	**Flashing ROAM (Bit D3).** If enabled, ROAM light will flash when home area roaming. (1 = enabled).
	0	**Audio Convenience (Bit D2).** If disabled, audio levels are recentered on power-up. 1 = disabled).
	0	**Time Receive Calls (Bit D1).** Call timers will accumulate on incoming calls when enabled. (1 = enabled).
	1	**Charge Rate (Bit D0).** When enabled, telephone will response to charge rate information; call timers will be disabled. (1 = enabled).

Table 3. NAM Programming Sequence (Cont'd.)

Step	Standard Default	Description
14	0023	**Initial Paging System.** There are 4 significant bytes for the initial paging channel. For system A enter 0023 and system B enter 0334 or 0323.
15	0023	**Initial A system channel.** To initialize system A enter 0023.
16	0323	**Initial B system channel.** To initialize system B enter 0323.
17	021	**Dedicated Paging Channels.** Number of dedicated paging channels is 21. Enter 021.
18		**E Option Bytes.**
	0	**(Bit E7).** Not Used. Enter 0.
	0	**Bit E6.** Enter 0.
	0	**Bit E5.** Not Used. Enter 0.
	0	**Bit E4.** Transportable speaker present. Set to 1 if the transportable has a speaker in the housing.
	0	**Bit E3.** Not Used. Enter 0.
	0	**Bit E2.** Not Used. Enter 0.
	0	**Bit E1.** Not Used. Enter 0.
	1	**Word Sync Scan Disable (Bit E0).** Portable use only. Enter 1.

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